Corrosion behaviour of dual-phase and galvanized steels in concrete

Abstract

Purpose: The purpose of this paper is to present results of an evaluation of dual-phase and galvanized steel reinforcements in corrosive environments. Design/methodology/approach: Low carbon steels were intercritically annealed at 740°C followed by water quenching to obtain dual-phase structures with 37 per cent volume fraction of martensite dispersed in ferrite matrix. Dual-phase and galvanized steel rebars were embedded in concrete cubes and immersed in 5 per cent NaCl solution for up to 100 days. Corrosion rate, tensile and macro as well as microhardness tests were performed. The dual-phase and galvanized zinc layers were observed under scanning electron microscopy (SEM). Findings: From all of the tests carried out it was found that dual-phase steels exhibited better corrosion resistant properties and superior strength compared to galvanized steels. Originality/value: The results reported show that dual-phase steel can be a good candidate for reinforcement in concrete especially in aggressive and corrosive environments.